



File Code: 3420

Date: October 19, 2006

Route To:

Subject: Bark Beetle Activity in Forest Health Projects on the Williams RD

To: District Ranger, Williams RD, Kaibab NF

On August 25 and September 19, 2006, I visited the Williams RD, Kaibab NF, at the request of Mark Herron to evaluate potential forest health projects on the District. I describe in this report what bark beetle activity was observed in these areas and make recommendations to minimize future bark beetle impacts. Additional discussion of bark beetle biology and management actions aimed at reducing bark beetle caused impacts was provided in previous site visit reports sent to the District in October 2003 and September 2004.

Elk and Frenchy Non-commercial Thinning Forest Health Projects

Elk

The Williams RD is proposing to non-commercially thin a total 150 acres of ponderosa pine forest in 2007 within the larger Elk-Lee project area located approximately 15 miles south of the City of Williams. The primary objectives for this thinning are to improve forest health, reduce dwarf mistletoe, improve stand and individual tree resilience and vigor, reduce risk of catastrophic wildfire, and improve vegetative species diversity.

Proposed treatments include non-commercial thinning of ponderosa pine up to 14 inches in diameter; resulting in a residual average density of 50 to 70 trees per acre. In addition, ponderosa pine up to 14 inches in diameter would be felled for 30 feet around large oak and yellow pine in order to increase their longevity and vigor. Activity slash will be rough piled and burned at a later date. The proposed non-commercial thinning along with associated activity slash treatments would reduce the Fire Regime Condition Class for the treated sites from a Condition Class 3 to a Condition Class 2.

I conducted a walk through survey of thinning Units 46, 56, and 62 to observe bark beetle activity and general stand conditions. These units have experienced high bark beetle-caused mortality over the past few years and are currently experiencing moderate bark beetle activity (**Figure 1**). Currently-infested pines were observed to have both *Ips* species (*I. pini*, *I. calligraphus*) and western pine beetle (*Dendroctonus brevicomis*). The stands to be thinned range from moderate stocking levels (80 trees/ac, 100 ft²/ac BA) to very dense stocking levels (>400 trees/ac, >150 ft²/ac BA). Trees are mostly ponderosa pine saplings to small sawtimber (4 to 18" diameter) with scattered larger pine in the overstory. Tree stocking levels are 5 to 25 times greater than pre-Euro American settlement stocking levels. A few sites proposed for thinning in the Elk project area also have pockets of heavy dwarf mistletoe infection in ponderosa pine.



Figure 1. Forest stand conditions and bark beetle activity within the Elk-Lee Project area south of Williams, AZ. Densely stocked ponderosa pine (top left), Ips-killed ponderosa pine infected with dwarf mistletoe (top right), western pine beetle galleries (bottom left), and old and new beetle-killed ponderosa pine.



Frenchy

The Williams RD is proposing to non-commercially thin and machine pile a total 59 acres of ponderosa pine forest in 2006 in the Frenchy project area. The primary objectives for this thinning are to improve forest health, to improve stand and individual tree resilience and vigor, to reduce risk of catastrophic wildfire, and to improve vegetative species diversity. The Frenchy project area is located in the intensive wildland urban interface (WUI) zone and is directly adjacent to the private Pine-Aire Estates subdivision. This area was initially scheduled for a commercial thin, but due to access problems for a logging operation, it was decided that the units would be thinned non-commercially. Treatment would include thinning ponderosa pine trees up to 14" DBH resulting in an average residual density of 50 to 70 trees/acre. Activity slash will be machine piled and burned at a later date.

I examined two areas proposed for non-commercial thinning for bark beetle activity and general stand conditions within the Frenchy project; Unit 31 (15 acres) and Unit 33 (44 acres). Low levels of current bark beetle activity were occurring in both units. Evidence of previous high levels of bark beetle-caused tree mortality was also evident. Four 10 BAF variable radius plots were installed in each thinning unit to determine the density of stands. In Unit 31 there is a mix of dense younger stands (e.g., >120 ft²/ac basal area) and relatively low density large diameter pine. In Unit 33 there are several areas of high density pine (e.g., >140 ft²/ac basal area).

Recommendations

Both proposed project areas for non-commercial thinning treatments will help to reduce the overall susceptibility of stands to bark beetle attack in the long term as well as improve overall tree vigor, lessen risk of catastrophic wildfire, and improve vegetative species diversity. If limited funding is available, I recommend that priority be given to the Frenchy project as it is within the WUI zone and in close proximity to the Pine-Aire Estates subdivision. Both proposed project areas are already covered under signed NEPA documentation.

High stand density reduces both individual tree and stand vigor which increases stand susceptibility to mortality from bark beetles. Over the past several years the Kaibab National Forest has seen an epidemic build-up of bark beetle populations with a large amount of associated mortality in ponderosa pine. Excess competition from smaller trees has also greatly increased the risk of loss due to mortality of the scattered large yellow pine and large oak in the area. Continuous interlocking crowns and well-developed fuels ladders leaves vegetation on these sites at a high risk of loss from catastrophic wildfire.

Thinning from below has been experimentally demonstrated to increase the resistance level of the residual mature pine overstory (Feeney, et al., 1998). Thinning slash may pose a short-term risk to residual trees in the thinning units or surrounding areas depending on the timing of thinning, local population of pine engraver beetles, and site and environmental factors such as site quality and precipitation. Careful monitoring of beetle populations associated with these thinning projects should be implemented. Parker (1991) provides guidelines for minimizing pine engraver beetle impacts associated with thinning treatments.

Prevention funds may be available for FY 2007 from Forest Health Protection to implement projects related to bark beetle and dwarf mistletoe activity in these projects sites. Requests for these funds should be submitted no later than October 13, 2006.

If you have any questions regarding my assessment of current bark beetle activity within the proposed project areas or my recommendations, please let me know.

/s/ Joel D. McMillin

JOEL D. McMILLIN

Entomologist, Forest Health, Arizona Zone

cc: Mailroom R3 Kaibab

Mark W Herron

Stu Lovejoy

John Anhold

Debra Allen-Reid

Gilbert Zepeda

References Cited

- Feeney, S.R., T.E. Kolb, M.R. Wagner, and W.W. Covington. 1998. Influence of thinning and burning restoration treatments on pre-settlement ponderosa pines at the Gus Pearson Natural Area. *Canadian Journal of Forest Research* 28: 1295-1306.
- Parker, D.L. 1991. Integrated pest management guide: Arizona five-spined Ips, *Ips lecontei* Swaine, and Pine engraver, *Ips pini* (Say), in ponderosa pine. USDA Forest Service, Southwestern Region, R-3, 91-8. 17 p.